

PROPOSED NEW CLAIMS

21. A use of a rare earth metal cobalt oxide having a perovskite crystal structure as a catalyst in a hydrocarbon fuel processor for processing a hydrocarbon fuel into a simple fuel.

22. The use according to claim 21, in which the catalyst further includes one of a noble metal and a noble metal oxide.

23. The use according to claim 21, in which the catalyst comprises a solid solution having the perovskite crystal structure of the rare earth metal cobalt oxide and an alkaline earth metal cobalt oxide.

24. The use according to claim 21, in which the rare earth metal is lanthanum.

25. The use according to claim 22, in which the one of the noble metal and noble metal oxide is one of ruthenium and ruthenium oxide.

26. The use according to claim 22, in which the one of the noble metal and noble metal oxide is one of platinum and platinum oxide.

27. The use according to claim 23, in which the alkaline earth is selected from a group consisting of calcium, strontium and barium.

28. The use according to claim 23, in which alkaline earth metal cobalt oxide is in a proportion up to 50% of the catalyst.

29. The use according to claim 22, in which the one of the noble metal and noble metal oxide is included up to 2 mole% of the catalyst.

30. The use according to claim 21, in which the catalyst undergoes thermal decomposition such that its surface becomes coated with catalytically active lanthium oxide, hydrated lanthium oxide and cobalt metal particles.

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31. The use according to claim 21, wherein the simple fuel is hydrogen.
32. A hydrocarbon fuel processor catalyst, comprising: a rare earth metal cobalt oxide having a perovskite crystal structure.
33. The catalyst according to claim 32, and further including one of a noble metal and a noble metal oxide.
34. The catalyst according to claim 32, and including a solid solution having the perovskite crystal structure of the rare earth metal cobalt oxide and an alkaline earth metal cobalt oxide.
35. The catalyst according to claim 32, in which the rare earth metal is lanthanum.
36. The catalyst according to claim 33, in which the one of the noble metal and noble metal oxide is one of ruthenium and ruthenium oxide.
37. The catalyst according to claim 33, in which the one of the noble metal and noble metal oxide is one of platinum and platinum oxide.
38. The catalyst according to claim 34, in which the alkaline earth is selected from a group consisting of calcium, strontium and barium.
39. The catalyst according to claim 34, in which the alkaline earth metal cobalt oxide is in a proportion up to 50% of the catalyst.
40. The catalyst according to claim 33, in which the one of the noble metal and noble metal oxide is included up to 2 mole % of the catalyst.
41. A hydrocarbon fuel processor for converting a hydrocarbon fuel to hydrogen, comprising: a catalyst comprising a rare earth metal cobalt oxide having a perovskite crystal structure.